Nachrichten has not considered it was necessary to reprint it in that journal, where the ephemerides for previous appearances have always found a place.

After the death of Dr. von Asten, the calculations for this comet were taken up by Dr. O. Backlund, who has continued the computation of the perturbations by Venus, the Earth, Mars, Jupiter, and Saturn from 1878 to 1881, taking account also of the effect of the so-called resisting-medium on the mean motion and angle of excentricity. The following are the elements of the comet's orbit :—

Epoch 1881, July 2·0 M.T. at Berlin

Mean anomaly	319	26	48″·7	
Longitude of perihelion	158	30	5·5	M.Eq. 1881·0.
,, ascending node ...	334	34	3·1	
Inclination	12	53	0·3	
Angle of excentricity	57	43	30·75	
Mean daily sidereal motion ...	1072″·65852			

From these elements we find—

Semi-axis major ... 2·22005	Perihelion dist. ... 0·34301
Semi axis minor ... 1·18547	Aphelion dist. ... 4·09709
Excentricity ... ... 0·8454969	Period ... ... 1208·21 days

The track of the comet in the heavens at this appearance is a favourable one for observation in this hemisphere. It will be nearest to the earth on October 11, when it will be distant 0·543 of the earth's mean distance from the sun, and situated in the constellation Leo Minor, in the vicinity of the star Fl 21, and the theoretical intensity of light will attain a maximum on November 9, when the comet situated near 89 Virginis will rise about 2h. 15m. before the sun.

The following ephemeris for the month of August is contracted from the accurate one given by Dr. Backlund, and applies to mean midnight at Berlin :—

	R.A. h. m. s.	Decl. ° ′	Log. distance from Sun.	Log. distance from Earth.
August 1 ...	2 56 22 ...	+26 31·0 ...	0·2701 ...	0·2400
3 ...	3 0 23 ...	27 0·3		
5 ...	3 4 31 ...	27 30·2 ...	0·2592 ...	0·2173
7 ...	3 8 46 ...	28 0·7		
9 ...	3 13 9 ...	28 31·9 ...	0·2478 ...	0·1934
11 ...	3 17 41 ...	29 3·9		
13 ...	3 22 22 ...	29 36·6 ...	0·2359 ...	0·1683
15 ...	3 27 14 ...	30 10·2		
17 ...	3 32 18 ...	30 44·5 ...	0·2233 ...	0·1419
19 ...	3 37 35 ...	31 19·8		
21 ...	3 43 6 ...	31 56·0 ...	0·2101 ...	0·1142
23 ...	3 48 53 ...	32 33·1		
25 ...	3 54 58 ...	33 11·2 ...	0·1962 ...	0·0850
27 ...	4 1 23 ...	33 50·2		
29 ...	4 8 10 ...	34 30·3 ...	0·1814 ...	0·0543
31 ...	4 15 23 ...	+35 11·3		

It remains to be seen whether the comet can be perceived with the larger telescopes of the present day with a less intensity of light than 0·24, which was that at the time of its discovery in August, 1848, with the 15-inch refractor at Harvard College, U.S., and which will correspond to about the day of new moon, August 24.

Comet 1881 *c*.—Elements of this comet have been published in circulars issued from Lord Crawford's Observatory at Dun Echt, from which it appears that it will increase very considerably in brightness. The perihelion passage does not take place until August 21. The comet is rapidly approaching the earth.

BIOLOGICAL NOTES

On some New Lower Green Algæ.—George Klebs publishes some very interesting facts about a number of forms of green Algæ found living within the cell-tissues of some flowering-plants. The painstaking way in which the life-history of these have been worked cannot be too sufficiently admired. For full details the student should refer to the numbers of the *Botanische Zeitung* for April and May, where also will be found excellent coloured illustrations of all the species. In order to call attention to these curious species we give the specific diagnosis in detail :—*Family Protococaceæ. Genus Chlorochytrium.*—Through continued division into two parts each cell becomes resolved into spherical zoospores, which upon leaving the mother-cell conjugate within the gelatinous envelope. The zygozoospores before becoming surrounded with a membrane make their way by means of processes into the intercellular spaces of living plants. During the time favourable for vegetation many generations follow one another in a single year; that nearest to the winter falls into a resting stage. *Chlorochytrium lemnæ.*—This species lives in the widened intercellular spaces of the parenchyma of the *Lemna trisulca :* cells chiefly spherical or elliptical; the part of the growing zygospore which remains in connection with the epidermis becomes a spherical cellulose plug. In the next genus, Endosphæra, through continued division into two, each cell falls into a number of daughter-cells surrounded with a membrane, from which, by further division, the spherical zoospores result; those, taking their origin from the same mother-cell, immediately upon leaving it conjugate; they make their way into living tissues like those of the Chlorochytrium. The formation of zoospores only takes place in the spring; the new generation requires a full year to reach maturity. The species *Endosphæra biennis* lives in the intercellular spaces of the sub-epidermal parenchyma of leaves of *Potamogeton lucens:* its cells are mostly spherical; the part of the germinating zoospore which remains in connection with the epidermis soon dies off. In the genus Phyllobium at the time of maturity, the protoplasm of every cell containing chlorophyll is differentiated into cylindrical or spherical portions, through the changing of some of these into smaller ones, zoospores—both macro and micro are formed—these conjugate. The zygozoospores make their way into the stomates of partly living, partly dead leaves of phanerogams. The development of every cell takes a year. The species *Phyllobium dimorphum* lives in the leaves of *Lysimachia nummularia*, Ajuga, Chlora, &c.; the zygozoospores develop processes which grow into branched green tubes among the vascular bundles belonging to the veins of the leaves. The protoplasm of those zygospores which develop a process forms into either a spherical or longish resting cell, which lasts during the winter, and in the next summer again develops zoospores. According to the surrounding circumstances the processes are well developed or not. They may be quite rudimentary, in which case small tubeless resting cells become formed, which form asexual zoospores. In the genus Scotinosphæra every cell shows at the time of maturity a differentiation of its green protoplasm into cylindrical or spherical bodies; by their conjugating, during which a reddish granular substance is secreted, a single mass is formed, through whose repeated division, during which division the granular substance is gradually again taken up, the zoospores are formed. These are asexual, and make their way into decaying vegetable tissues. Their development lasts a year. *Scotinosphæra paradoxa* lives in the dead or dying tissues of *Lemna trisulca*, and also in species of Hypnum. Its cells are mostly spherical, and the zoospores are spindle-shaped. (*Botanische Zeitung*, May 27, 1881.)

On the Influence of Intermittent Illumination on the Development of Chlorophyll.—Dr. Karl Mikosch and Dr. Adolf Stöhr publish the result of their investigations made in the Physiological Institution of the Vienna University. The results of these they summarise as follows :—If a continuedly-lasting 2·5-minutes illumination of etiolated seedlings of barley or oats is compared with an intermittent illumination in the relation of 1 : 1 lasting five minutes, then one will find that in both cases the light is throughout present an equal time. Now if the chlorophyll-formation takes place at the same time as the illumination, then the working of the continued illumination must exactly correspond at the end of 2·5 minutes with the sum of the single effects of the intermittent illumination. As a matter of fact, however, at the end of the continued illumination there has been either no chlorophyll formed, or at any rate no quantity of it that can be pointed out anywhere. On the other hand, the mass of chlorophyll which is formed during the intermittent illumination is beyond doubt capable of being pointed out with a spectroscope. One must therefore imagine that a certain time elapses between illumination and chlorophyll-formation. From this however it follows :—1. That the chlorophyll-formation is a process of photochemic induction. The first trace of chlorophyll that can be pointed out with a spectroscope appears in seedlings of barley and oats grown in the dark after illumination lasting five minutes; it is a matter of indifference whether it is illuminated the whole time through, or only in the relation of 1 : 1 second. One cannot take for granted that in the one case only the half quantity of chlorophyll is formed when an alcoholic solution even shows the absorption-lines of the chlorophyll spectrum, still this will clearly disappear if the solution is made

half as weak again. Consequently the smallest possible effective light for the formation of chlorophyll is attained by intermittent illumination. During the formation of chlorophyll light is supplied in superabundance by a continued illumination in the same manner as at the heliotropic bendings.

A FRENCH physiologist, M. Gley, has made some delicate experiments on himself with regard to the effects of attention and intellectual work on cerebral circulation. His results confirm those of M. Mosso, and he has added some new observations. He finds that the rhythm of the heart through intellectual work is slightly accelerated; and this increase seems in direct ratio of the intensity of the attention. Thus the pulse was more frequent when the author studied geometry, with which he had little familiarity, than when he studied philosophy, of which he had a good knowledge. While the heart-rhythm is accelerated the carotid artery is dilated during cerebral work, and the carotidian pulse becomes dicrotic. But the radial pulse becomes smaller and less ample. The phenomena of congestion observed in the brain persist a certain time after cerebral activity.

CHEMICAL NOTES

BY the action of methylic iodide, in presence of sodium, on an alcoholic solution of morphine, M. Grimaux has succeeded in producing codeine, identical in properties with the naturally-occurring alkaloid (*Compt. rend.*). If ethylic iodide is employed in place of the methyl salt, a new alkaloid differing in composition from codeine by CH_2, is produced. M. Grimaux proposes to call all the homologous bodies of this series *codeines*, and to distinguish the commonly called codeine as *codomethyline*, the new homologue as *codethyline*, &c.

IN *Gazzetta Chimica Italiana* S. Valente describes a striking lecture experiment illustrative of the fact that chlorine replaces iodine from binary-compounds. A jar, 500 c.c. capacity, is filled with dry hydriodic acid gas, and another, 250 c.c. capacity, with dry chlorine, the jars being separated by a glass plate, and the larger being uppermost; on withdrawing the plate decomposition of the hydriodic acid occurs with a flash of rose-coloured flame, and separation of iodine.

SS. BARTOLI AND PAPASOGLI claim to have prepared mellitic and hydromellitic acids by the long-continued electrolysis of water, using carbon electrodes (*Nuovo Cemento*).

S. FUNARO describes two nickeliferous minerals from the Apennines in the *Gazzetta Chim. Ital.*, to one of which he gives the formula $(FeNi)_7S_8$, and to the other the formula $Cu_2R_{10}Sb_4S_{17}$, where R = Cu : Fe : Ni = 3·4 : 4·2 : 2·4.

IN continuing his investigation of the action of hydrogen peroxide on aromatic compounds (NATURE, vol. xxiv. p. 111) Dr. A. R. Leeds shows that in some of these compounds the peroxide acts only as an oxidiser, in other cases it replaces hydrogen by (OH), and sometimes both actions occur together (*Berliner Berichte*).

THE same chemist has repeated (*Amer. Chem. Journ.*) many of these experiments, wherein ozone is said to be produced by the action of heat on metallic and non-metallic oxides; he finds that in every case the supposed ozone reaction, obtained by bringing the evolved oxygen into contact with potassium iodide and starch, is due to traces of impurities, generally to traces of chlorine.

ACCORDING to M. Chappuis (*Bull. Soc. Chim.*) the phosphorescence of phosphorus in oxygen or air is an accompaniment of the combustion of phosphorus vapour by ozone. Phosphorus is not luminous in pure oxygen at 15°, and at the ordinary pressure, introduction of a trace of ozone causes luminosity; those substances which hinder the luminosity of phosphorus, *e.g.* turpentine oil, are substances which destroy ozone. If a little turpentine oil is brought along with phosphorus into a tube containing pure oxygen, and a small quantity of ozone is then passed in, the phosphorus exhibits luminosity for a few moments only; M. Chappuis supposes that this is due to the combustion of phosphorus vapour by the ozone, and that the transiency of the phenomenon is explained by the rapid removal of the ozone by the turpentine oil.

EXPERIMENTS on the action of heat on oxides of manganese, by S. V. Pickering, are detailed in *Chem. News*. According to this chemist some specimens of manganese oxides undergo a slow molecular change when kept. Thus a sample containing, when freshly prepared, 85·149 per cent. MnO_2, 9·356 per cent. MnO, and 5·490 per cent. H_2O, *lost* 1·065 per cent. oxygen when heated to 100°, but after eighty days the same sample *gained* 0·24 per cent. oxygen when heated to 100°, and 1·114 per cent. at 195°.

HERR E. RAMANN concludes from his experiments (*Berliner Berichte*) that the passivity of iron is always caused by the formation of a layer of magnetic oxide (Fe_3O_4) on the surface of the iron. In addition to nitric acid, the following liquids induce passivity in iron, viz. ammoniacal silver nitrate solution, solutions of nitrate of silver, ammonium, aluminium, nickel, cobalt, or iron.

THE same author describes an amalgam of iron, nearly of the composition expressed by the formula Hg_3Fe_2, prepared by the action of sodium-amalgam on finely-divided iron in presence of water. Dry sodium-amalgam has no action on iron.

HERREN V. MERZ AND W. WEITH have investigated the action of heat on various amalgams with the view of determining whether these bodies lose mercury regularly as temperature increases, or whether they exhibit the properties of definite compounds. The results, which are detailed in the *Berliner Berichte*, seem to show that many amalgams, *e.g.* of gold, silver, copper, bismuth, lead, cadmium, &c., although very easily decomposed by heat, nevertheless contain their component elements in definite proportions by weight; such amalgams are probably to be classed as molecular compounds. Amalgams of the alkali metals exhibit the properties of definite compounds in a greater degree than amalgams of the other metals.

IN the *Berichte* Herr V. Meyer publishes a note on the densities of the vapours of the halogens, in which he states that he means to relinquish the further working out of these problems to M. Crafts. He states that he has obtained numbers for the densities of phosphorus and arsenic which stand midway between those required by the formulæ P_4 and As_4, and P_2 and As_2.

VARIOUS papers on new nitrogen derivatives of carbon compounds are published in the same *Berichte*, by Prof. V. Meyer and his students; these papers promise results of much interest. Hitherto "azo-compounds" have only been known in the aromatic series; nitroso-substitution compounds of what is apparently azo-ethane are described by Prof. Meyer, especially $NO-C_2H_4-N_2-C_2H_4-NO$. A new series of organic bases called "*ketines*" is also described. The starting-point of this series is *ketine* or nitrosoacetene, $CH_3-CO-CH_2(NO)$.

HERR STRECKER (*Annalen Phys. Chem.*), from determinations of the velocity of sound in chlorine, bromine, and iodine gases, has obtained the following numbers for the specific heats of these gases:—

	Chlorine.	Bromine.	Iodine.
At constant pressure ...	0·115	0·05504	0·03489
At constant volume ...	0·08373	0·04257	0·02697
Ratio of values of the two specific heats ...	1·323	1·293	1·294

From these results it is concluded that the action and reaction between the atoms in the molecules of these gases is different in kind from that which subsists in other diatomic molecules, *e.g.* oxygen or carbon monoxide.

REMSEN has again investigated the action of finely-divided iron in inducing the formation of cyanide when nitrogen is passed over a hot mixture of carbon, iron, and an alkaline metal; he finds (*American Chem. Journ.*) that freshly reduced iron induces a large formation of cyanide, but that iron after keeping for some time loses this power.

FROM experiments on the decomposition of barium carbonate by ammonium chloride solution, Tommasi (abstract in *Berliner Berichte*) concludes that an aqueous solution of sal-ammoniac contains free ammonia and free hydrochloric acid.

REFERENCE was recently made in these Notes to the experiments of Jones on gaseous boron hydride; Reinitzer describes experiments (*Wien. Akad. Ber.*) which appear to show that when dilute hydrochloric acid acts on potassium boride the solid green-brown amorphous powder which is formed is a boride of hydrogen approximately of the formula $B_{3\cdot32}H$.

CONSIDERABLE doubt has been expressed whether calomel is or is not liable to decomposition in the human system, with production of corrosive sublimate. According to experiments described by P. Hoglan (*Chem. News*) calomel is slowly changed